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REMARKS

Entry of this amendment, reconsideration of the above-identified application in view of the amendments to the claims and the following remarks is respectfully requested. Claim 1 has been amended to recite in part **wherein the optical transmitter and optical receiver are configured for respectively transceiving image signals and Ethernet communication signals in two directions by a single laser diode and photo diode,** which is disclosed in the specification at least at page 4, lines 13-16, and the Abstract, last three lines. Applicant has also amended the claims to overcome all grounds of rejection under 35 U.S.C.§112, second paragraph. Claim 6 has been similarly amended but only with regard to a receiver side.

Claims 1-6 and 8-12 are pending herein, and all have been finally rejected. Claims 1-12 stand rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1-5 and 8-12 stand rejected under 35 USC § 103(a) as allegedly being obvious over Farmer (US 7,146,104) in view of Bohn *et al.* (US 5,311,344) ("Bohn"), and in view of Spurgeon (*Ethernet: The Definitive Guide, chapters 9 and 10).* Claim 6 stands rejected under 35 U.S.C.§103(a) as allegedly being obvious over Farmer in view of Spurgeon. Applicant respectfully traverses these grounds of rejection for the reasons indicated herein below.

With regards to the rejections under 35 U.S.C.§112, second paragraph:

(1) Applicant respectfully submits that claims 4 and 10 have been amended to provide antecedent basis and remove the word "type", respectively.

(2) With regard to the rejection of "FX" in claims 11 and 12, Applicant

respectfully submits that this abbreviation is commonly known and used in the art, and stands for Fast Ethernet. FX is used in the art to describe Ethernet transmission hire than the 10Mb/s standard, typically 100Mb/s or more. Applicant has amended claims 11 and 12 to recite the term "Fast Ethernet".

(3) With regard to the term "PHY Device", Applicant has submitted herewith a definition from a known source disclosing that a PHY chip (or PHYceiver) "is commonly found on Ethernet devices., Its purpose is digital access of a modulated link. Usually used together with an MII-chip" (MII being "Media Independent Interface"). Applicant has also submitted herewith a page disclosing information regarding MII and PHY. Accordingly, as these terms are commonly known and used, Applicant respectfully submits that there is no indefiniteness issue with regard to 35 U.S.C.§112, second paragraph. Reconsideration and withdrawal of all grounds of rejection are respectfully requested.

With regard to the rejections under 35 U.S.C.§103(a), Applicant respectfully submits that a person of ordinary skill in the art would not have found any of the present claims to have been obvious at the time of invention.

According to the present invention as recited by claim 1, a single laser diode (LD) and photo diode (PD) are provided in each of the OLT (bi-directional transmitter) and ONU (bi-directional receiver). The OLT combines communication (a high-speed Ethernet signal) and broadcast data for transmission through a single server LD. The OLT receives the high-speed Ethernet communication signal through the PD. The ONU similarly receives the combined signal through a single optical receiver PD and outputs the signal through a laser diode (LD).

With regard to the combination of Farmer, Bohn and Spurgeon, the combination fails to disclose or suggest any of the present claims as none of references, alone or in combination discloses that both broadcast signals and communication data are sent in two directions by a single LD and PD.

For example, the combination fails to disclose a single LD and PD providing two way direction as (1) Farmer discloses a plurality of "transmitters" (plural) and a plurality of lasers in col. 11, lines 21-28; (2) Bohn fails to show broadcast data and communication data by a single PD and LD (Bohn fails to disclose broadband data is sent with communication data); and (3) Spurgeon also fails to disclose both broadcast signals and communication data sent in two directions by a single LD and PD two directions. Accordingly, the combination, as a whole, fails to provide this recitation in Applicant's claim 1.

With regard to rejections under 35 U.S.C.§103(a), Applicant respectfully submits that the United States Court of Appeals for the Federal Circuit required a showing of **an unrebutted *prima facie* case of obviousness** (*In re Rouffet*, 149 F.3d 1350, 47 USPQ2d 1453 (Fed. Cir. 1998) (citing *In re Deuel*, 51 F.3d 1552, 1557, 34 USPQ2d 1210, 1214 (Fed. Cir. 1995))). According to United States Court of Customs and Patent Appeals, the predecessor to the Federal Circuit, the *prima facie* case can be established only if the prior art references, among others, **teach all features** in the claims (*In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1970); see also **MPEP 2143.03**), or if the claim or claims recite features as combined in the claims that would have been within the ordinary skill in the art (*KSR International Co. v. Teleflex Inc. et al.*, No. 04-1350, U.S. Supreme Court, decided April 30, 2007).

With regard to the above paragraph, Applicant respectfully submits that, the Office Action does not set forth a *prima facie* case of obviousness under 35 U.S.C.§103(a) against any of the claims in view of the combination of references because the features, as combined in the claims, are clearly not met by the combined teachings of Farmer, Bohn and Spurgeon, nor is the combination of elements in any of the claims subject matter that is within the level of ordinary skill in the art.

Accordingly, independent claims 1 and 6 are not obvious over any combination of references. Reconsideration and withdrawal of these grounds of rejection are respectfully requested.

The other claims in this application are each dependent from independent claim 1 discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration of the patentability of each on its own merits is respectfully requested.

For all the foregoing reasons, it is respectfully submitted that all the present claims are patentable in view of the cited references. A Notice of Allowance is respectfully requested.

Should the Examiner deem there are any issues that may be best resolved by telephone, please contact Applicant's undersigned attorney at the number indicated herein below.

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Enclosures:
Two pages of Wikipedia

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PHY

From Wikipedia, the free encyclopedia

PHY (often pronounced "fi.", IPA: [faɪ]) is a common abbreviation for the physical layer of the OSI model.

PHY is also a generic electronics term referring to a special electronic integrated circuit or functional block of a circuit that takes care of encoding and decoding between a pure digital domain (on-off) and a modulation in the analog domain. Often used to interface a field-programmable gate array (FPGA) or Complex Programmable Logic Device (CPLD) to a specific type of interface.

Example uses

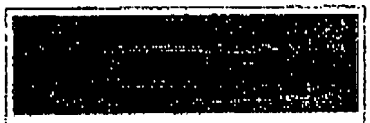
- Ethernet: A PHY chip (called PHYceiver) is commonly found on Ethernet devices. Its purpose is digital access of the modulated link. Usually used together with an MII-chip.
- USB: A PHY chip is integrated into most Universal Serial Bus (USB) controllers in hosts or embedded systems and provides the bridge between the digital and modulated parts of the interface.
- IrDA: The Infrared Data Associations IrDA specification includes an IrPHY specification for the physical layer of the data transport.
- S-ATA: Serial ATA controllers like the VIA6421 use a PHY.

Retrieved from "http://en.wikipedia.org/wiki/PHY"

Categories: Physical layer protocols | Integrated circuits | Computer hardware stubs

Media Independent Interface

From Wikipedia, the free encyclopedia



MII connector on a Sun Ultra 1 Creator workstation

The **Media Independent Interface** (MII) is a standard interface used to connect a Fast Ethernet MAC-block to a PHY. The MII may connect to an external transceiver device via a pluggable connector (see photo) or simply connect two chips on the same printed circuit board. Being media independent means that any of several different types of PHY devices can be used without redesigning or replacing the MAC hardware. The equivalents of MII for other speeds are AUI (for 10 megabit Ethernet), GMII (for gigabit Ethernet), and XAUI (for 10 gigabit Ethernet).

MII bus

The MII bus (standardized by IEEE 802.3u) is a generic bus that connects different types of PHYs to the same network controller (MAC). The network controller may interact with any PHY using the same hardware interface, independent of the media the PHYs are connected to. The MII transfers data using 4-bit words (nibble) in each direction, clocked at 25 MHz to achieve 100 Mbit/s speed. CNR connector Type B carries MII bus interface signals.

Serial Management Interface (SMI) is used to transfer management information between MAC and PHY.

The standard MII features a small set of registers:

- Basic Mode Configuration (#0)
- Status Word (#1)
- PHY Identification (#2, #3)
- Ability Advertisement (#4)
- Link Partner Ability (#5)
- Auto Negotiation Expansion (#6)

The MII Status Word is the most useful datum, since it may be used to detect whether an Ethernet NIC is connected to a network. It contains a bitmask with the following meaning:

```
0x8000 Capable of 100baseT4
0x7800 Capable of 10/100 HD/FD (most common)
0x0040 Preamble suppression permitted
0x0020 Autonegotiation complete
0x0010 Remote fault
0x0008 Capable of Autonegotiation
0x0004 Link established
0x0002 Jabber detected
0x0001 Extended MII register exist.
```

A more detailed reference on registers exported by MII-compatible transceivers could be found looking at the Linux MII interface definition (include/linux/mii.h) [1] (http://lxr.linux.no/source/include/linux/mii.h)